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(54) I.C. Engine Carburetted Mixture Swirling Device

(57) A plate 2 has an opening 5 with a single row of tapered and pointed projections 6 having their medial lines at two angles to the perpendicular to the plate. The device is formed by punching a blank (9), Fig. 5 (not shown), e.g. of aluminium sheet, with a hole (12) about one-third of the diameter of the opening 5 and cuts (11), e.g. twelve, at an angle of 45° to the radial, the projections 6 thus formed being bent from the plate 2 to an angle (X), Fig. 3 (not shown), to the perpendicular of 7°, the other angle (Y) of inclination of the medial lines (8) being 25°

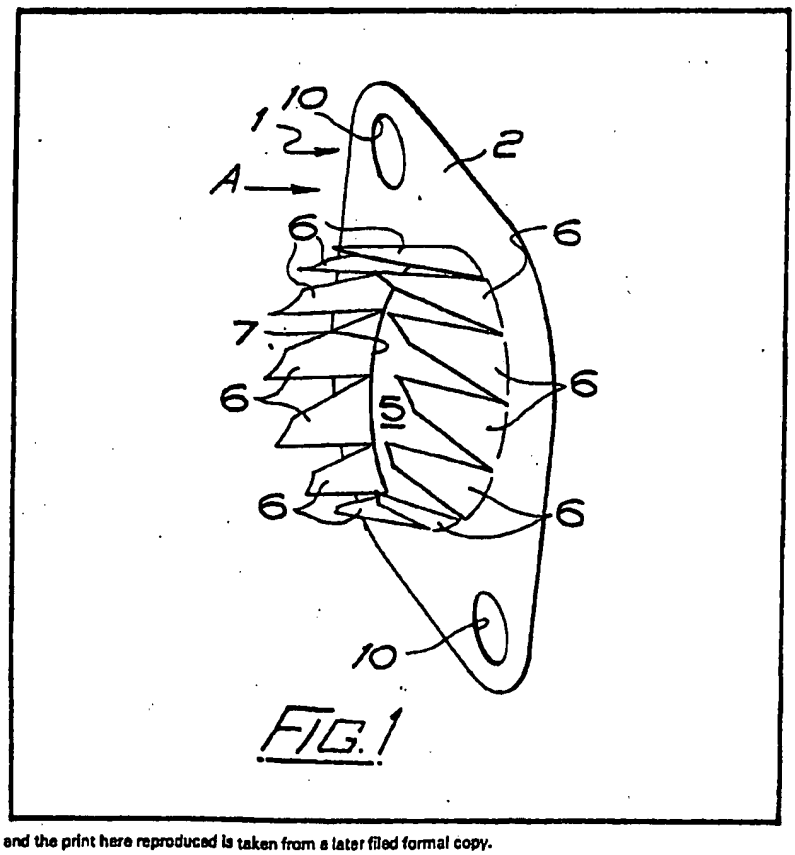

FIG. 1

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The drawing originally filed was informal and the print here reproduced is taken from a later filed formal copy.

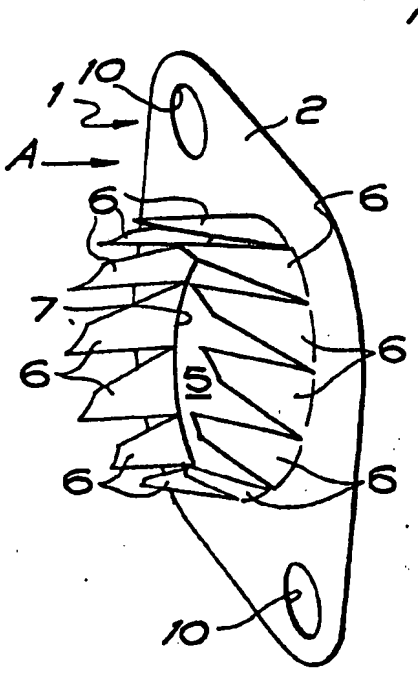

FIG. 1

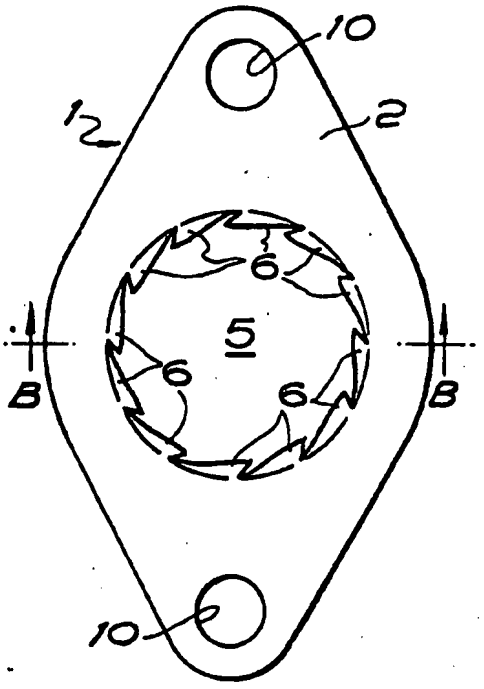

FIG. 2

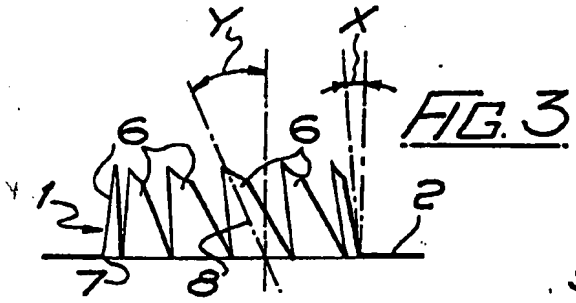

FIG. 3

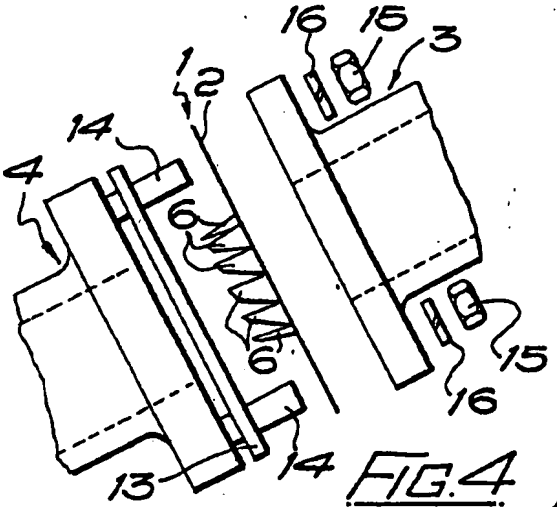

FIG. 4

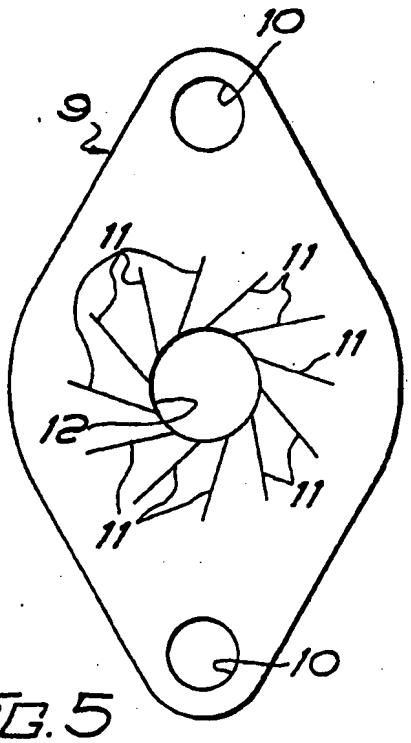

FIG. 5

SPECIFICATION

Fuel Economiser for Internal Combustion Engine

This invention relates to a fuel economiser for an internal combustion engine and has for its object the provision of a simple low cost, effective device.

It is known to provide between the carburettor and the inlet manifold of an internal combustion engine a fuel economiser consisting of a mounting plate with an opening and outer periphery corresponding in shape to the mating flanges of the carburettor and the inlet manifold (and with the usual bolt holes), and a generally frusto-conical array of pointed projections in several concentric rings projecting from the opening in the mounting plate into the inlet manifold, but this form of economiser was expensive to produce and not very effective because it effected economy mainly by restricting the inlet manifold and at the expense of performance of the engine.

According to the present invention, therefore, a fuel economiser for an internal combustion engine comprises a plate for mounting between the carburettor and the inlet manifold, with an opening in the mounting plate and a single ring of projections adapted to project from the edge of the opening into the inlet manifold, the projections being tapered and pointed and having their medial lines at two angles to the perpendicular to the mounting plate, whereby all the projections are inclined the same way in a rotational sense and also converge in the one direction away from the mounting plate.

The tapered and pointed projections encourage atomising of fuel flowing from the carburettor into the inlet manifold, and the inclination of the projections in two directions creates a swirling in the fuel/air mixture that promotes very good mixing, while the simple form can be produced by punching and bending out of sheet metal, e.g., aluminium.

The angle of convergence is preferably not greater than 7° to the perpendicular to the mounting plate, and the perpendicular length of the projections from the mounting plate to the tips of their points is preferably not greater than one-third of the diameter of the opening in the mounting plate, so that there is no appreciable restriction of the inlet manifold. The other angle of inclination of the medial lines of the projections is preferably not less than 20° and not greater than 40°.

Most conveniently, the fuel economiser of the invention is formed by punching out a plate with a hole of about one-third of the diameter of the inlet bore of an inlet manifold, from which hole radiate twelve cuts each at an angle of 45° to the radial, the tapered and pointed portions thus defined then being bent all one way from the plate to an angle to the perpendicular of 7°. The usual bolt holes are also formed by the same punching operation.

A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of an economiser in accordance with the invention;

Figure 2 is an elevation in the direction of the arrow A in Figure 1;

Figure 3 is a section from the line B—B of Figure 2;

Figure 4 is an exploded elevation on a smaller scale showing the disposition of the economiser of Figures 1 to 3 between the carburettor and the inlet manifold of an engine; and

Figure 5 is an elevation of a cut blank from which the economiser of Figures 1 to 3 is pressed.

Figures 1 to 3 show a fuel economiser 1 for an internal combustion engine, the economiser comprising a plate 2 for mounting between the carburettor 3 and the inlet manifold 4 (see Figure 4) with an opening 5 in the mounting plate and a single ring of twelve projections 6 adapted to project from the edge 7 of the opening into the inlet manifold, the projections being tapered and pointed and having their medial lines 8 at two angles X, Y to the perpendicular to the mounting plate whereby all the projections are inclined in the same way in a rotational sense and also converge in the one direction away from the mounting plate.

The tapered and pointed projections 6 encourage atomising of fuel flowing from the carburettor 3 into the inlet manifold 4, and the inclination of the projections in two directions creates a swirling in the fuel/air mixture that promotes very good mixing, while the simple form of the economiser 1 can be produced by punching a blank 9 (Figure 5) out of sheet metal, e.g., aluminium, with bolt holes 10, and bending the projections 6 out of the plane using press tools.

The angle of convergence X is 7° to the perpendicular to the mounting plate 2, and the perpendicular length of the projections 6 is one-third of the diameter of the opening 5, so that there is no appreciable restriction of the inlet manifold. The other angle of inclination Y of the medial lines 8 of the projections is 25° and results from there being twelve cuts 11 radiating from a hole 12 in the blank 9 at an angle of 45° to the radial.

Figure 5 also shows that the existing gasket 13 between the carburettor 3 and the inlet manifold 4 should be interposed between the mounting plate 2 of the economiser 1 in accordance with the invention and the inlet manifold 4 before securing to the carburettor 3 by the bolts or studs 14 and nuts 15 with spring washers 16.

Series of tests have been carried out on a new Leyland (Registered Trade Mark) Mini (Registered Trade Mark) with 1000 cc. engine and four-speed gearbox during acceleration in 2nd gear from 5 m.p.h. to 30 m.p.h. with full throttle opening, on a straight and level course with still air conditions. The test equipment used was the "Tapley Fuel

Meter" manufactured by Tapley and Company Limited, which by means of a flow transducer installed in the fuel supply line, between pump and carburettor, recorded fuel flow (i.e. fuel consumption) on an electronic L.E.D. digital display to within 1/10,000 of a gallon.

Standard Carburettor		*Standard Carburettor*	
No Device Fitted Series 1 Tests Run	*Reading*	*Device Fitted Series 2 Tests Run*	*Reading*
1	.019	1	.015
2	.019	2	.014
3	.019	3	.015
4	.019	4	.014
5	.020	5	.014
6	.019	6	.012
7	.019	7	.016
8	.019	8	.013
		9	.016
		10	.013
		11	.015
		12	.011
		13	.011
		14	.015
		15	.014
		16	0.12
		17	.011
		18	.013
		19	.011
		20	.013
		21	.012
I.e. Average Run=.019		I.e. Average Run=.0133	

Saving=.019–.0133=.0057=30%

The Series 1 tests prove that the measuring apparatus is extremely accurate, while the Series 2 tests prove that, although the figures fluctuate between .011 and .016 (which cannot be explained), economy is effected at every test and is very significant. In view of the test figures it is fair to assume that under day-to-day driving conditions, an overall saving of 10% should be well within the capabilities of an economiser in accordance with the invention.

No drop in engine performance was perceptible either as regards acceleration or maximum speed.

Claims

1. A fuel economiser for an internal combustion engine comprising a plate for mounting between the carburettor and the inlet manifold, with an opening in the mounting plate and a single ring of projections adapted to project from the edge of the opening into the inlet manifold, the projections being tapered and pointed and having their medial lines at two angles to the perpendicular to the mounting plate, whereby all the projections are inclined the same way in a rotational sense and also converge in the one direction away from the mounting plate.

2. An economiser as in Claim 1, wherein the angle of convergence is not greater than 7° to the perpendicular to the mounting plate.

3. An economiser as in Claim 2, wherein the perpendicular length of the projections from the mounting plate to the tips of their points is not greater than one-third of the diameter of the opening in the mounting plate.

4. An economiser as in Claim 2 or Claim 3, wherein the other angle of inclination of the medial lines of the projections is not less than 20° and not greater than 40°.

5. An economiser as in any one of Claims 1 to 4, formed by punching out a plate with a hole of about one-third of the diameter of the inlet bore of an inlet manifold, from which hole radiate twelve cuts each at an angle of 45° to the radial, the tapered and pointed portions thus defined then being bent all one way from the plate to an angle to the perpendicular of 7°.

6. An economiser as in Claim 5, formed of aluminium.

7. A fuel economiser for an internal combustion engine substantially as hereinbefore described with reference to the accompanying drawings.

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